The Somatic Pre-Occupation and Coping Questionnaire

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ORIGINAL ARTICLE

Use of both short musculoskeletal function assessment questionnaire and short form-36 among tibial-fracture patients was redundant

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The SPRINT Investigators

- Between July 2000 to September 2005, we enrolled 1339 skeletally mature patients with open (Gustilo Types I-IIIB) or closed fractures (Tscherne Types 0-3) of the tibial shaft that were managed with intramedullary nailing. Patients were asked to complete the SF-36 and SMFA at 3, 6, and 12 months post surgical fixation.

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Table 3

SF-36 PCS and SMFA DI scores by patient's healing status

Follow-up time	Fracture status	n	SF-36 PCS score[a]		SMFA DI[a]	
			Mean	SD	Mean	SD
3 Months postsurgery	Healed	144	37.1	9.2	25.4	16.5
	Not healed	577	33.5	9.2	32.9	17.5
6 Months postsurgery	Healed	348	41.6	10.5	19.0	15.7
	Not healed	309	36.9	10.6	26.5	19.3
12 Months postsurgery	Healed	533	44.6	10.7	15.6	15.8
	Not healed	79	35.1	11.4	29.9	20.1

[a] All comparisons of mean scores for healed vs. nonhealed fractures were statistically significant at $P \leqslant 0.001$.

- **Differences in Functional Scores between radiographically healed and non-healed fractures were statistically significant, but only barely crossed the threshold for clinical importance at 3 and 6 months post-op.**

The Issue

Orthopedic surgeons tend to treat imaging studies, and not patients.

The association between imaging studies and functional recovery may be limited.

Berger evaluated a consecutive sample of 1000 workers' compensation patients in Quebec who had undergone lumbar spinal surgery; 600 patients with single operations and 400 with multiple.

71% percent of the single operation group had not returned to work more than 4 years after the operation, and 95% of the multiple operations group.

Berger E. Late postoperative results in 1000 work related lumbar spine conditions. Surg Neurol. 2000; 54(2): 101-6.

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Some authors have suggested that patients' expectations of recovery and illness perceptions may influence their outcome, and a recent systematic review has provided support for this hypothesis.

A subsequent prospective study found that injured workers' recovery beliefs, elicited through telephone interview, were independent predictors of clinical outcome.

Mondloch MV, et al. CMAJ 2001; 165: 174-179.
Cole DC, et al. CMAJ 2002; 166: 749-754.

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Prior studies have primarily focussed on subjective complains (e.g. LBP)

Could patient beliefs predict recovery from severe orthopedic trauma?

We developed the somatic pre-occupation and coping (SPOC) questionnaire to explore this hypothesis.

Search for Relevant Literature

A MEDLINE search with the medical subject heading (MeSH) "fracture healing", and at least of one of the MeSH subheadings "self-assessment", "self-concept" or "attitude to health", or at least one of the following six key words: "expectation", "belief", "prediction", recover", "outcome" or "improve".

A content expert directed us to:

The General Health Questionnaire

The Somatization Subscale of the Symptom Check List-90

The Chalder Fatigue Questionnaire, and

The Illness Attitude Scales

The SPOC Questionnaire

After including relevant items from these instruments, with modifications for the target population, the resulting SPOC questionnaire consisted of 60 items, with seven response options ranging from 0 to 6 for each item.

Face and content validity were assessed.

We administered our instrument to a consecutive sample of 359 adult patients with tibial fractures, 316 of whom provided complete data.

Items with a mean score of <1 were excluded, as they were assumed to capture no meaningful distress feature.

Items showing a SD <1 were also excluded, as this limited variation suggested that the item was rated homogenously for the majority of patients.

Factor analysis suggested retaining 4 domains, comprising 27 items:

somatic complaints – 10 items

coping – 6 items

energy – 7 items

optimism – 4 items

The mean SPOC score in our population was 57.1 (SD = 28.5), values ranged from 0 to 147, and the distribution was normal.

An important change in continuous outcome measures can be estimated as ½ a SD of the aggregate score for a given population, and by this standard a 14-point difference on the SPOC would be considered meaningful.

Association with 1-year SF-36 PCS Scores ($R^2 = 0.39$)

Variable	Univariable Analysis (unstandardized regression coefficients (95% CI))	p-value	R-square	Multivariable Analysis (unstandardized regression coefficients (95% CI))	p-value
Gender		0.58	<0.01		0.39
- male	reference category			reference category	
- female	-1.07 (-4.76 to 2.62)			-1.33 (-4.37 to 1.70)	
Age (for each 10-year increment)	-0.78 (-1.80 to 0.23)	0.13	0.01	-1.40 (-2.25 to -0.56)	<0.01
Smoking Status		<0.01	0.06		<0.01
- not currently smoking	reference category				
- current smoker	-5.96 (-9.32 to -2.60)			-4.28 (-7.09 to -1.48)	
Fracture type		<0.01	0.08		<0.01
- closed	reference category			reference category	
- open	-6.77 (-9.93 to -3.61)			-5.00 (-7.65 to -2.35)	
Multi-Trauma		0.08	0.02		0.14
- no multi-trauma	reference category			reference category	
- multi-trauma	-2.89 (-6.09 to 0.31)			-1.96 (-4.54 to 0.62)	
SPOC Score (for each 14-point increment)	-2.92 (-3.58 to -2.25)	<0.01	0.28	-2.67 (-3.31 to -2.03)	<0.01

Association with 1-year SF-36 MCS Scores ($R^2 = 0.30$)

Variable	Univariable Analysis (unstandardized regression coefficients (95% CI))	p-value	R-square	Multivariable Analysis (unstandardized regression coefficients (95% CI))	p-value
Gender		0.50	<0.01		0.51
- male	reference category			reference category	
- female	1.36 (-2.60 to 5.31)			1.17 (-2.33 to 4.66)	
Age (for each 10-year increment)	-0.21 (-1.30 to 0.89)	0.71	<0.01	-0.94 (-1.91 to 0.04)	0.06
Smoking Status		0.01	0.02		0.15
- not currently smoking	reference category			reference category	
- current smoker	-4.62 (-8.28 to -0.96)			-2.37 (-5.60 to 0.86)	
Fracture type		0.05	0.02		0.34
- closed	reference category			reference category	
- open	-3.58 (-7.09 to -0.07)			-1.47 (-4.52 to 1.59)	
Multi-Trauma		0.19	0.01		0.37
- no multi-trauma	reference category			reference category	
- multi-trauma	-2.29 (-5.74 to 1.16)			-1.34 (-4.32 to 1.63)	
SPOC Score (for each 14-point increment)	-3.11 (-3.83 to -2.39)	<0.01	0.27	-3.01 (-3.75 to -2.27)	<0.01

SPOC Validation

The addition of pre-injury SF-36 scores to our models did not alter findings.

The addition of SF-36 scores 2-weeks post-op to models did not alter findings.

The SPOC questionnaire is not a pre-injury measure, or a surrogate for SF-36 scores.

SPOC score and RTW at 1-year

Odds of Return to Work at 12-Months according to 6-week SPOC scores (n=186)

SPOC quartile	Working at 1 year (%)	Not Working at 1 year (%)	Multivariable Analysis* odds ratio (95% CI)	Likelihood Ratio (95% CI)
1st quartile (scores ≤ 35)	42 (89%)	5 (11%)	6.86 (2.48 to 18.97)	4.62 (1.92 to 11.11)
2nd quartile (35.1 to 53.5)	37 (71%)	15 (29%)	1.37 (0.65 to 2.89)	1.36 (0.81 to 2.28)
3rd quartile (53.6 to 76)	26 (59%)	18 (41%)	1.15 (0.53 to 2.49)	0.79 (0.47 to 1.34)
4th quartile (scores > 76)	15 (35%)	28 (65%)	0.21 (0.10 to 0.47)	0.29 (0.17 to 0.51)

Key: Analysis is adjusted for age, gender, smoking status, fracture type (open or closed), and multi-trauma

Pre- and Post-Test Probability of RTW by SPOC quartile

Assuming a pre-test probability of 0.64 (120 working at 1-year/186 total)

Post-test probability for the 1st quartile (<35) is: 0.89

Post-test probability for the 4th quartile (>76) is: 0.34

SPOC scores at 6-weeks post-surgery accounted for 18% of the variation in patient-reported physical function and mental function, as measured by SF-36 PCS and MCS scores respectively at 1-year.

SPOC scores at 6-weeks were a far more powerful predictor of functional recovery and RTW than age, gender, fracture type, smoking status, or the presence of multi-trauma.

There are no validated instruments available to capture the impact of illness beliefs that are predictive of functional recovery following trauma.

This lack of knowledge complicates efforts to improve the care of orthopaedic trauma patients.

The SPOC questionnaire is the first validated instrument that captures illness beliefs among orthopaedic trauma patients, and is highly predictive of functional outcome at 1-year.

This suggests the possibility that trauma patients with unhelpful illness beliefs could be identified early in the treatment process and targeted for concurrent therapy designed to modify such cognitions.

Explore the addition of other potentially predictive variables, such as co-morbidity, compensation status and ongoing litigation.

The generalizability of our results to other populations is uncertain and will require investigation.

Are the illness beliefs captured by the SPOC questionnaire amenable to modification, and would modifications lead to important improvement to functional outcome.

If so, what range of SPOC scores would identify patients likely to benefit from intervention.

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For elective procedures, could the SPOC questionnaire identify patients who are poor surgical candidates?

Sciatica

Low back fusion surgery

Etc.

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Thank You!